

IN THE SPECIFICATION:

Please **REPLACE** the first full paragraph on page 86 with the following paragraph:

--In this embodiment UNDX (Ono, I. and Kobayashi, S: A Real-coded Genetic Algorithm for Function Optimization Using Unimodal Normal Distribution Crossover, Proceeding of 7th International Conference on Genetic Algorithms, pp. 246-253 (1997)) is adopted as a crossover operator. The UNDX generates, from two parents of Parent 1 and Parent 2 out of selected parents, two children according to a normal distribution set around them, as shown in FIG. 27. The standard deviation of the normal distribution is set so that a component σ_1 along the major-axis direction connecting the both parents is proportional to a distance between the parents ($\sigma_1 = \alpha d_1$, where d_1 : the distance between Parent 1 and Parent 2) and so that a component σ_2 along the other axis is proportional to a distance between the major axis and Parent 3 ($\sigma_2 = \beta d_2$, where d_2 : the distance between Parent 3 and the axis connecting Parent 1 with Parent 2). FIG. 27 illustrates an example of two variables. --

Please **REPLACE** the second full paragraph on page 92 with the following paragraph:

--FIG. 38 shows a state in which the best solution P (the lens system shown in FIG. 31) obtained in Experiment 1 of the first embodiment described above is plotted on the enlarged view of FIG. 37. In the drawing letter S-Q indicates lens systems dominating the solution found by the single-objective optimization of the evaluation criteria. As also apparent from this FIG. 38, it is clearly seen that the second embodiment (multi-objective optimization) obtains many more excellent solutions than that obtained by the single-objective GA. This conceivably suggests that there is a possibility of making the problem harder if the multi-objective problem is forced to be the single-objective problem.--

Please **REPLACE** the first full paragraph on page 96 with the following paragraph:

-- FIG. 39 is a schematic diagram of the structure of the photographic lens system. In this figure g designates the image plane. The photographic lens system of this figure is an example of the three-lens configuration, in which there are six boundary surfaces of a to g having their respective curvatures, and six distances of d_1 to d_6 between the boundary surfaces (d_1 between A and B, d_2 between B and C, d_3 between C and D, d_4 between D and E, d_5 between E and F, and d_6 between F and G).--

Please **REPLACE** the second full paragraph on page 100 with the following paragraph:

-- FIG. 41 illustrates a gene representation of ten parameters of continuous values featuring the lens system in the three-lens configuration shown in FIG. 39. In each of a-e ~~a-g~~ and d1-d5 in the same drawing a parameter of the corresponding lens system is stored in the form of continuous value. Among such genes, n (n>1) genes satisfying the minimum constraints are reproduced arbitrarily. --

Please **REPLACE** the first full paragraph on page 112 with the following paragraph:

-- The n-dimensional coordinates of the point P4 reproduced by above steps ST4-1 to ST4-6 correspond to the n parameters a, b, c, d, e, f, d1, d2, d3, d4, d5 of a chromosome of a new-born gene or a child. In this step ST4 of the fourth embodiment the substeps ST4-1 to ST4-6 described above are repeated m times, whereby m new genes are reproduced from the three parents Pa1, Pa2, Pa3. --

Please **REPLACE** the second full paragraph on page 116 with the following paragraph:

-- In the case of the multi-objective optimization, steps ~~S44-ST110~~ and ~~S45-S47~~ ST150-ST170 below are executed in place of above steps ST1 and ST5-ST7. --

Please **REPLACE** the second full paragraph on page 122 starting at line 4 and ending at line 13 with the following paragraph:

-- Under the above preconditions, the parameters in the designing method of optical system according to the fourth embodiment are set as listed below:-

Size of initial population: 50;

Number of crossovers: 300,000;

Number of children generated by crossover operator: 20;

σ_a of UNDX: $0.5 \times \sqrt{VC1VC2VC4VC6}$;

σ_b of UNDX: $1;$ ~~and~~

σ_c of UNDX: $0.35 \times (VC1VC2)^{1/n}$; --